

CLAIMS

1. A toner cartridge comprising:
a toner receptacle configured to accommodate toner,
the toner receptacle having an opening; and
5 a receptacle holding member engaged with the toner
receptacle such that the receptacle holding member covers
or closes the opening and holds the toner receptacle
rotatably, and as the toner receptacle rotates, toner in
the toner receptacle passes to the receptacle holding
10 member via the opening, wherein
the receptacle holding member includes a pipe
insertion section on which an insertion passage is formed
to insert a pipe member configured to be fixed to an image
forming apparatus, and is formed such that the insertion
15 passage extends along a direction parallel to a direction
of axis of rotation of the toner receptacle.
2. The toner cartridge according to claim 1, wherein the
receptacle holding member has a first engaging section
20 configured to engage with a protrusion of the image forming
apparatus that sticks out along a direction parallel to the
direction of axis of rotation of the toner receptacle in a
positioning member that is fixed to the image forming
apparatus, in a position shifted from the axis of rotation
25 of the toner receptacle.
3. The toner cartridge according to claim 1, wherein the
receptacle holding member has a second engaging section
configured to engage with a recessed section of the image
30 forming apparatus that is dented along a direction parallel
to the direction of axis of rotation of the toner
receptacle in a positioning member fixed to the image
forming apparatus, in a position shifted from the axis of

rotation of the toner receptacle.

4. The toner cartridge according to claim 2, wherein
the receptacle holding member includes a toner storage
5 section in which the toner is stored before being
discharged out of the receptacle holding member, and
the insertion passage extends along a direction
parallel to the direction of axis of rotation of the toner
receptacle, and is connected to the toner storage section.

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5. The toner cartridge according to claim 1, wherein the
toner receptacle has a shape of a long and slender cylinder
along the direction of axis of rotation.

15 6. The toner cartridge according to claim 4, wherein a
connecting passage that connects the insertion passage and
the toner storage section of the receptacle holding member,
the insertion passage, and the toner storage section are
.. positioned in a line in this order in a direction
20 orthogonal to the direction of axis of rotation.

7. The toner cartridge according to claim 6, wherein the
connecting passage is provided such that it extends
straightly in the direction orthogonal to the direction of
25 axis of rotation.

8. The toner cartridge according to claim 7, wherein the
connecting passage has a taper that tapers from the toner
storage section to the insertion passage.

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9. The toner cartridge according to claim 6, wherein a
shutter member that closes an opening on the side of the
insertion passage in the connecting passage is provided

such that it can slide between a position that closes the opening in the insertion passage and a position where it exposes the opening.

- 5 10. The toner cartridge according to claim 9, wherein a sealing member that seals a gap between the pipe insertion section and the shutter member in the insertion passage, is fixed to an inner wall of the insertion passage of the pipe insertion section.

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11. The toner cartridge according to claim 10, wherein the sealing member is provided at a location in the insertion passage upstream than a location connecting with the connecting passage in a direction of insertion of the pipe member, and at a location in the insertion passage downstream than the location connecting with the connection passage in the direction of insertion of the pipe member.
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12. The toner cartridge according to claim 11, wherein the shutter member has a diameter same as that of the pipe member .
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13. The toner cartridge according to claim 1, wherein toner is accommodated in the toner receptacle.
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14. The toner cartridge according to claim 13, wherein the toner is a refilled toner that is refilled into the toner receptacle after the toner receptacle becomes empty upon using the toner in an image forming apparatus.
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15. The toner cartridge according to claim 13, wherein among a plurality of toner cartridges accommodating toners of different colors in the toner receptacles set in the

same image forming apparatus, a shape of a projection image of each of the toner receptacles in the direction of axis of rotation of the receptacle holding member is different.

5 16. The toner cartridge according to claim 1, wherein a connecting passage connects the insertion passage and a toner storage section in the receptacle holding member, and after toner sent from the toner receptacle to the receptacle holding member drops to the connecting passage,
10 the toner flows into the pipe member through the connecting passage to be discharged out of the receptacle holding member, and an airtightness between the insertion passage on a downstream side in a direction of transportation of toner from the connecting passage and the pipe member
15 inserted into the insertion passage is superior than an airtightness between the toner receptacle on an upstream side in the direction of transportation of toner from the connecting passage and the receptacle holding member.

20 17. The toner cartridge according to claim 1, wherein a porous sealing member made of a porous material is provided between the toner receptacle and the receptacle holding member, and a non-porous sealing member made of a non-porous material is provided between the insertion passage
25 and the pipe member, and therefore, an airtightness between the insertion passage and the pipe member is superior than an airtightness between the toner receptacle and the receptacle holding member.

30 18. The toner cartridge according to claim 16, wherein the receptacle holding member includes an engaging section configured to engage with the toner receptacle and an insertion section in which the insertion passage is formed,

the insertion section being configured to fit to the engaging section, and an airtightness between the engaging section and the insertion section is superior than an airtightness between the engaging section and the toner receptacle.

19. The toner cartridge according to claim 18, wherein a porous sealing member made of a porous material is provided between the toner receptacle and the receptacle holding member, and a non-porous sealing member made of a non-porous material is provided between the engaging section and the insertion section, and therefore, an airtightness between the engaging section and the insertion section is superior than an airtightness between the toner receptacle and the receptacle holding member.

20. The toner cartridge according to claim 17, wherein the porous sealing member is made of an elastic material, and the toner receptacle engaged with the receptacle holding member jams in the porous sealing member.

21. An image forming apparatus comprising:
a toner image forming unit that forms a toner image on a recording body;
a toner cartridge that accommodates toner to be supplied to the toner image forming unit and is detachable from the image forming apparatus; and
a suction unit that sucks the toner in the toner cartridge and carries the toner to the toner image forming unit, wherein
the toner cartridge includes
a toner receptacle configured to accommodate toner, the toner receptacle having an opening, and

a receptacle holding member engaged with the toner receptacle such that the receptacle holding member covers or closes the opening and holds the toner receptacle rotatably, and as the toner receptacle rotates, toner in
5 the toner receptacle passes to the receptacle holding member via the opening, wherein

the receptacle holding member includes a pipe insertion section on which an insertion passage is formed to insert a pipe member configured to be fixed to an image
10 forming apparatus, and is formed such that the insertion passage extends along a direction parallel to a direction of axis of rotation of the toner receptacle, wherein

the suction unit sucks the toner in the receptacle holding member through the pipe member inserted into the
15 insertion member.

22. The image forming apparatus according to claim 21, wherein, in the toner cartridge,

the receptacle holding member has a first
20 engaging section configured to engage with a protrusion of the image forming apparatus that sticks out along a direction parallel to the direction of axis of rotation of the toner receptacle in a positioning member that is fixed to the image forming apparatus, in a position shifted from
25 the axis of rotation of the toner receptacle,

the receptacle holding member includes a toner storage section in which the toner is stored before being discharged out of the receptacle holding member, and

the insertion passage extends along a direction
30 parallel to the direction of axis of rotation of the toner receptacle, and is connected to the toner storage section,

and while mounting the toner cartridge on to the image forming apparatus, the first engaging section or the second

engaging section of the receptacle holding member is engaged with a protrusion or a recessed section of the positioning member before the pipe member is inserted into the insertion passage.

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23. The image forming apparatus according to claim 21, wherein the toner cartridge has a positioning member for positioning with respect to the image forming apparatus, wherein, in the toner cartridge,

10 the receptacle holding member has a first engaging section configured to engage with a protrusion of the image forming apparatus that sticks out along a direction parallel to the direction of axis of rotation of the toner receptacle in a positioning member that is fixed
15 to the image forming apparatus, in a position shifted from the axis of rotation of the toner receptacle,

 the receptacle holding member has a second engaging section configured to engage with a recessed section of the image forming apparatus that is dented along
20 a direction parallel to the direction of axis of rotation of the toner receptacle in a positioning member fixed to the image forming apparatus, in a position shifted from the axis of rotation of the toner receptacle,

 the receptacle holding member includes a toner
25 storage section in which the toner is stored before being discharged out of the receptacle holding member, and

 the insertion passage extends along a direction parallel to the direction of axis of rotation of the toner receptacle, and is connected to the toner storage section,

30 and the positioning member includes a protrusion or a recessed section that engages with the first engaging section or the second engaging section of the receptacle holding member.

24. An image forming apparatus that uses a toner cartridge including

5 a toner receptacle configured to accommodate toner, the toner receptacle having an opening; and
a receptacle holding member engaged with the toner receptacle such that the receptacle holding member covers or closes the opening and holds the toner receptacle rotatably, and as the toner receptacle rotates, toner in
10 the toner receptacle passes to the receptacle holding member via the opening, wherein

the receptacle holding member includes a pipe insertion section on which an insertion passage is formed to insert a pipe member configured to be fixed to an image
15 forming apparatus, and is formed such that the insertion passage extends along a direction parallel to a direction of axis of rotation of the toner receptacle, wherein

a connecting passage connects the insertion passage and a toner storage section in the receptacle holding
20 member, and after toner sent from the toner receptacle to the receptacle holding member drops to the connecting passage, the toner flows into the pipe member through the connecting passage to be discharged out of the receptacle holding member, and an airtightness between the insertion
25 passage on a downstream side in a direction of transportation of toner from the connecting passage and the pipe member inserted into the insertion passage is superior than an airtightness between the toner receptacle on an upstream side in the direction of transportation of toner
30 from the connecting passage and the receptacle holding member, the image forming apparatus comprising:

a carrier unit that carries the toner from the receptacle holding member to the toner image forming unit

via the pipe member by sucking the toner in the receptacle holding member through the pipe member.

25. A method of recycling a toner cartridge including a
5 toner receptacle that accommodates toner and a receptacle holding member engaged with the toner receptacle such that the receptacle holding member covers an opening formed in the toner receptacle and holds the toner receptacle so that the toner receptacle can rotate, in which after the toner
10 in the toner receptacle is sent to the receptacle holding member from the opening by rotation of the toner receptacle, the toner is discharged out of the receptacle holding member and then the toner is refilled in the toner receptacle, wherein

15 the receptacle holding member includes a pipe insertion section on which an insertion passage is formed to insert a pipe member configured to be fixed to an image forming apparatus, and is formed such that the insertion passage extends along a direction parallel to a direction
20 of axis of rotation of the toner receptacle, the method comprising:

removing the toner receptacle from the receptacle holding member;

25 refilling the toner in the toner receptacle after removing; and

setting the toner receptacle on the receptacle holding member upon refilling.

26. A method of recycling a toner cartridge including a
30 toner receptacle that accommodates toner and a receptacle holding member engaged with the toner receptacle such that the receptacle holding member covers an opening formed in the toner receptacle and holds the toner receptacle so that

the toner receptacle can rotate, in which after the toner in the toner receptacle is sent to the receptacle holding member from the opening by rotation of the toner receptacle, the toner is discharged out of the receptacle holding member and then the toner is refilled in the toner receptacle, wherein

the receptacle holding member includes a pipe insertion section on which an insertion passage is formed to insert a pipe member configured to be fixed to an image forming apparatus, and is formed such that the insertion passage extends along a direction parallel to a direction of axis of rotation of the toner receptacle,

the method comprising:

cutting a hole in the toner receptacle for refilling the toner;

refilling the toner in the toner receptacle through the hole; and

closing the hole.